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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/955,951	09/20/2001	Masayuki Shimizu	Q66266	9974

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EXAMINER
PHAM, HAI CHI

ART UNIT	PAPER NUMBER
2861	

DATE MAILED: 06/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/955,951	Applicant(s) SHIMIZU ET AL.	
	Examiner Hai C Pham	Art Unit 2861	

-- The MAILING DATE of this c mmunication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of claims 5 and 8 is withdrawn in view of the newly discovered reference to Hino (JP 2000-156525). Rejections based on the newly cited reference follow.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yano (U.S. 4,734,734) in view of Shimoda (U.S. 6,208,829 B1).

Yano discloses an image forming apparatus comprising a plurality of light emitting elements (LEDs 12) mounted on a substrate (not shown) and arranged along a perpendicular direction to the conveying direction of said photosensitive material (image bearing member 6) (col. 3, lines 29-49), a thin partitioning device (lateral walls 20) for partitioning said light emitting elements from each other, to prevent interference between rays from adjacent ones of said light emitting elements, a converging lens system (14) for projecting rays from said light emitting elements onto said photosensitive material, wherein each of said light emitting elements being assigned to

record a dot at a time when driven in synchronism with the conveying movement of said photosensitive material, thereby to print said latent image line by line.

However, Yano fails to disclose a diffusion device for diffusing rays from said light emitting elements, to equalize luminance of rays from each light-emitting element.

Nevertheless, Shimoda discloses an optical printing head (fourth embodiment, Fig. 9) comprising a plurality of light emitting elements (120) mounted on a substrate (122) and arranged along a perpendicular direction to the conveying direction of said photosensitive material (16), a diffusion plate (130) for diffusing light from said light emitting elements, the diffused light passing through the opening (106) in the mask (108) and being focused on the photographic paper 9160 by the lens array (26).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate a diffusion device as taught by Shimoda in the device of Yano. The motivation for doing so would have been to uniformize the entire light quantity and to attain the reduction in cost by means of low power consumption.

Yano further teaches a mask plate having openings (aperture 22) in correspondence with the light emitting elements (Fig. 2), the openings limiting heading directions of the rays from said light emitting elements (col. 3, line 63 to col. 4, line 9), and having a shape corresponding to an expected shape of said dot (col. 6, lines 3-29), the partitioning device (20) comprising a plurality of thin plates placed between said light emitting elements.

4. Alternatively, claims 1-4, 6, 7, 9, 10, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki (U.S. 6,034,712) in view of Shimoda.

With regard to claim 1, Iwasaki discloses an exposure apparatus comprising a plurality of light emitting elements (LEDs 7-9) mounted on a substrate (1) and arranged along a perpendicular direction to the conveying direction of said photosensitive material (37, Fig. 6), a thin partitioning device (separating walls 222, Fig. 14A) mounted on said substrate, for partitioning said light emitting elements from each other, to prevent interference between rays from adjacent ones of said light emitting elements, a converging lens system (122, Fig. 10) for projecting rays from said light emitting elements onto said photosensitive material (37), wherein each of said light emitting elements being assigned to record a dot at a time when driven in synchronism with the conveying movement of said photosensitive material, thereby to print said latent image line by line.

However, Iwasaki fails to disclose a diffusion device for diffusing rays from said light emitting elements, to equalize luminance of rays from each light-emitting element.

Nevertheless, Shimoda discloses an optical printing head (fourth embodiment, Fig. 9) comprising a plurality of light emitting elements (120) mounted on a substrate (122) and arranged along a perpendicular direction to the conveying direction of said photosensitive material (16), a diffusion plate (130) for diffusing light from said light emitting elements, the diffused light passing through the opening (106) in the mask (108) and being focused on the photographic paper 9160 by the lens array (26).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate a diffusion device as taught by Shimoda in the device of Iwasaki. The motivation for doing so would have been to uniformize the entire light quantity and to attain the reduction in cost by means of low power consumption.

With regard to claims 2-4, 6, 7, 10, 13, Iwasaki further teaches:

- a mask plate (13) having openings (pinholes 12) in correspondence with the light emitting elements (7-9) (col. 9, lines 61-65), the openings limiting heading directions of the rays from said light emitting elements [preventing any stray light to occur) (col. 23, lines 1-2) and having a shape corresponding to an expected shape of said dot (pinholes 12 whose diameter determines the resolution of an optical pattern on the photosensitive material) (col. 9, lines 58-61),
- the partitioning device (222) comprising a plurality of thin plates placed between said light emitting elements (Fig. 14A),
- spaces between said thin plates being filled up with a transparent coating material (transparent sealing material 11) to coat said light emitting elements,
- said partitioning device having a thick plate (222) having openings (delimited by the intervals between the separating walls) for exposing said light emitting elements,
- said openings of said thick walls being filled up with a transparent coating material (transparent sealing material 11) to coat said light emitting elements,

- said light emitting elements (7a-c, 8a-c, 9a-c) being arranged in a plurality of rows extending in a direction perpendicular to the conveying direction of the photosensitive material,

said light emitting elements being aligned in both directions and emitting rays of different colors (red, green, blue) form one row to another to print said latent image in said different colors.

5. Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki in view of Shimoda, as applied to claims 1, 3-4, 6-7 above, and further in view of Hino (JP 2000-156525).

Iwasaki, as modified by Shimoda, discloses all the basic limitations of the claimed invention except for the diffusion device comprising light diffusing particles mixed into the coating material.

Hino discloses a uniform lighting device having a plurality of LEDs mounted on a substrate, whose emission efficiency is increased by coating the surface of the LED chip with a filling material embedded with particles having optical diffuser function.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to providing the optical diffusing filling material as taught by Hino in the modified device of Iwasaki. The motivation for doing so would have been to provide a higher scattering intensity and thus a higher light yield, and to provide an improved homogeneity of the scattered light.

6. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki in view of Shimoda, as applied to claims 1, 10 above, and further in view of Oku (JP 4-284484).

Iwasaki, as modified by Shimoda, discloses all the basic limitations of the claimed invention except for the arrangement of the rows of the light emitting elements.

However, Oku discloses an electrophotographic copying machine comprising a plurality of rows of light-emitting elements, each of the light emitting elements being shielded form the others by partitioning walls (51b), each row being spaced from each other by a distance that is equal to a length of each light emitting element in the perpendicular direction to the conveying direction of the photosensitive material or drum (110), and the light emitting elements of one row are staggered from those of adjacent rows in said perpendicular direction by an amount approximately equal to said distance (Figs. 1b, 4).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Iwasaki, as modified by Shimoda, with the aforementioned teaching of Oku for the purpose of providing a high resolution of printed dots.

7. Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki in view of Shimoda and Yamakawa (U.S. 5,923,358).

Iwasaki, as modified by Shimoda (see rejection in above paragraph 4 of this Office action), discloses all the basic limitations of the claimed invention except for the plurality of printing heads, and the dichroic mirrors.

However, Yamakawa discloses an image forming device having either a single printing head (Fig, 1) or three printing heads (Fig. 4), each printing head comprising a plurality of light emitting elements (light emitting element arrays 21a-21c corresponding to the three primary colors) whose emitted light beams are synthesized by the dichroic mirrors (24a, and 24b) (col. 4, lines 8-16) to form parallel beams on the same optical axis.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Iwasaki, as modified by Shimoda, with the aforementioned teaching of Yamakawa for the purpose of recording color image on the photosensitive material with combined light sources of three primary colors.

Response to Arguments

8. Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new grounds of rejection as presented in this Office action.

With regard to Applicants' arguments concerning the pinholes 12 (openings of a mask plate) taught in the Iwasaki reference that does "not have a function to limit the heading direction of the rays", the examiner respectfully disagrees. Iwasaki teaches the provision of the mask plate having the pinholes (12) for preventing any stray light to

occur (col. 23, lines 1-2), which effectively limits the heading direction of the rays exiting through the pinholes. Nevertheless, it is well known in the art that the common function of the opening in the mask in such applications disclosed by either Iwasaki or the current Invention is to "limit the heading direction of the rays". By putting forth the above reasons against the teaching of Iwasaki, Applicants appear to deny the teaching of their own invention with regard to limitations set forth in claim 2.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (703) 308-1281. The examiner can normally be reached on T-F (8:30-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin R. Fuller can be reached on (703) 308-0079. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722, (703) 308-7724, (703) 308-7382, (703) 305-3431, (703) 305-3432 for regular communications and for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Hai Phan

HAI PHAM
PRIMARY EXAMINER

June 24, 2003